CLAIMS

1. A wavelength cross connect, comprising:

at least two optical waveguides having waveguide ends arranged in a first linear array extending in a first direction perpendicular to a propagation direction of light carried by said optical waveguides;

a wavelength dispersive element coupled to beams associated with each of said waveguide ends and spectrally separating wavelength components of said beams with wavelength-separated sub-beams disposed in a two-dimensional array arranged in a first waveguide direction and a first wavelength direction;

a first set of free-space optics coupling said waveguides and said wavelength dispersive element;

a plurality of micro electromechanical system (MEMS) mirrors arranged in a first MEMS mirror array arranged in at least a second wavelength direction to receive respective ones of said wavelength-separated sub-beams and selectively steering them.

2. The cross connect of Claim 1, wherein said first MEMS mirror array is a two-dimensional array additionally extending in a waveguide direction.

3. The cross connect of Claim 2, further comprising a fold mirror coupling pairs of mirrors in said first MEMS mirror array.

4. The cross connect of Claim 1, further comprising a second MEMS mirror array of MEMS mirrors extending at least in a third waveguide direction.

5. The cross connect of Claim 1, further compirsing a second set of free-space optics extending along said optical axis in said principal optical plane and coupling said wavelength dispersive element to said first MEMS mirror array.

6. The cross connect of Claim 5, wherein first beams passing between said first set of free-space optics and said wavelength dispersive element cross beams passing between said wavelength dispersive element and said MEMS mirrors.

7. The cross connect of Claim 6, wherein a magnification of a combination of said first and second free-space optics is between 10 and 100.

8. A wavelength cross connect, comprising:

at least three optical waveguides having waveguide ends arranged in a first linear array extending in a first direction perpendicular to a principal optical plane;

a wavelength dispersive element coupled to beams associated with each of said waveguide ends and spectrally separating wavelength components of said beams with wavelength-separated sub-beams disposed in a two-dimensional array arranged in a first waveguide direction and a first wavelength direction;

a plurality of micro electromechanical system (MEMS) mirrors arranged in a first MEMS mirror array arranged in at least a second wavelength direction and coupling at least one of said waveguides to a selected one of others of said waveguides; and

a first set of free-space optics extending along said optical axis in said principal optical plane and coupling said wavelength dispersive element to said first MEMS array.

9. The cross connect of Claim 8, wherein said first set of free-space optics includes a field-flattening lens.

10. The cross connect of Claim 9, wherein said field-flattening lens has a negative focal length and its periphery is thicker than is its center.

11. An optical cross connect, comprising:

a plurality of input waveguides carrying optical input signals input to said cross connect;

a plurality of output waveguides carrying optical output signals switched by said cross

connect and output therefrom;

a plurality of movable mirrors formed in a micro electromechanical system for selectively switching optical signals from said input waveguides to selected ones of said output waveguides; and

a single set of free-space optics extending along a single optical path extending from a first end adjacent said input and output waveguides to a second end adjacent said movable mirrors, wherein all of said input and output signals pass through said single set of free-space optics.

12. The cross connect of Claim 11, wherein said single set of free-space optics includes a single wavelength dispersive element.

13. The cross connect of Claim 12, wherein said single set of free-space optics includes a quarter-wave plate disposed between said wavelength dispersive element and said mirrors.

14. The cross connect of Claim 11, wherein said mirrors switch white-light optical signals.

15. The cross connect of Claim 11, wherein said ends of said input and output waveguides are arranged along a single axis substantially transverse to said optical path.

16. The cross connect of Claim 11, wherein said waveguides are optical fibers.

17. The cross connect of Claim 11, wherein said waveguides are formed in a common substrate.